Adaptive LIDAR Vision System for Advanced Robotics, Phase I
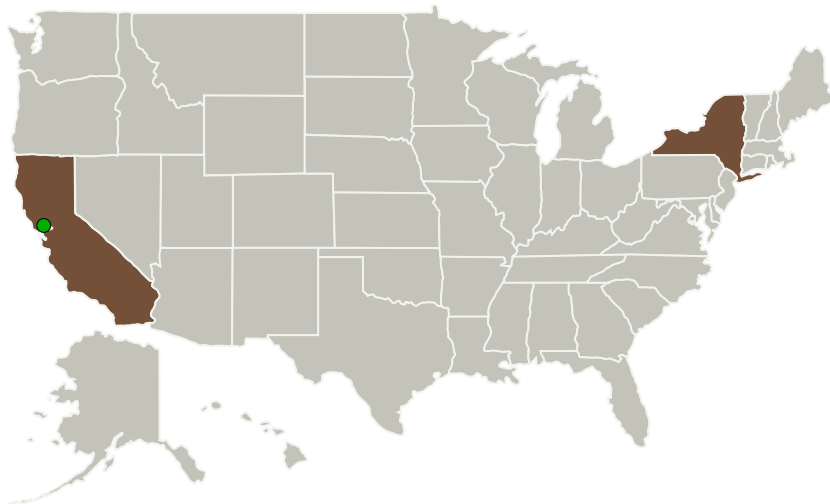
Completed Technology Project (2014 - 2014)

Project Introduction

Advanced robotic systems demand an enhanced vision system and image processing algorithms to reduce the percentage of manual operation required. Unstructured environments, whether man-mad (e.g., International Space Station) or natural (e.g., Mars), present significant challenges to supervised autonomy or fully autonomous systems – advanced perception sensors and associated software are required. This will be particularly important both for future long duration exploration missions where the transmit (Tx) / receive (Rx) delay will be substantial and a high degree of autonomy will be required to maximize science gain, as well as for telerobotic systems where a human operator is IVA and advanced operations in a short timeline are desired. No solution currently exists for small robotic platforms. Honeybee Robotics proposes to develop a compact, wide-angle, Light Detection and Ranging (LIDAR) system that is able to detect dynamic changes in the field of view (FOV) and focus the laser scan pattern centered on the area of interest while maintaining a lower-resolution fixed FOV for robotic path planning, navigation, inspection, and identification tasks.

Primary U.S. Work Locations and Key Partners

Adaptive LIDAR Vision System for Advanced Robotics Project Image

Table of Contents

Organizations Performing Work	Role	Type	Location
Honeybee Robotics, Ltd.	Lead Organization	Industry	Pasadena, California
🟢Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California

Primary U.S. Work Locations	
California	New York

Project Transitions

▶ **June 2014:** Project Start

✓ **December 2014:** Closed out

Closeout Documentation:
- Final Summary Chart*(https://techport.nasa.gov/file/137422)*

Images

Project Image
Adaptive LIDAR Vision System for Advanced Robotics Project Image
(https://techport.nasa.gov/image/125968)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Honeybee Robotics, Ltd.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:
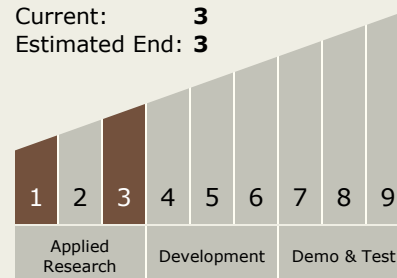
Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Jason Herman

Technology Maturity (TRL)

Start: **1**
Current: **3**
Estimated End: **3**

1	2	3	4	5	6	7	8	9
Applied Research			Development			Demo & Test		

TechPort

Printed on 12/07/2022
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For more information and an accessible alternative, please visit:
https://techport.nasa.gov/view/17741

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Technology Areas

Primary:

- TX10 Autonomous Systems
  └ TX10.1 Situational and Self Awareness
    └ TX10.1.1 Sensing and Perception for Autonomous Systems

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System